

Technical Note

TN 6.36 Modeling StormTech® Chambers in PCSWMM

Introduction

The following note provides instructions for modeling StormTech chambers in the hydrology and hydraulics modeling software PCSWMM. This document does not address setting up a rain gage, modeling a drainage system or inlet and outlet devices. This document has the sole purpose of detailing the process of modeling the chamber storage volume.

StormTech chambers are modeled in PCSWMM using the storage node method with a custom storage curve. This is the recommended method as it is simple to use and represents the volume available at every elevation with more accuracy. It requires the use of the StormTech Cumulative Storages spreadsheet to calculate the stage storage data. Data points are then copied from the spreadsheet into the tabular storage curve in PCSWMM when creating a new storage node.

General

The first step is computing the stage-storage curve using the StormTech Cumulative Storages spreadsheet. Once the project data (chamber model, number of chambers and end caps, stone above and below, stone void % and system area) is entered, the stage-storage curve will be computed.

After inserting the storage node and entering the invert in the PCSWMM model:

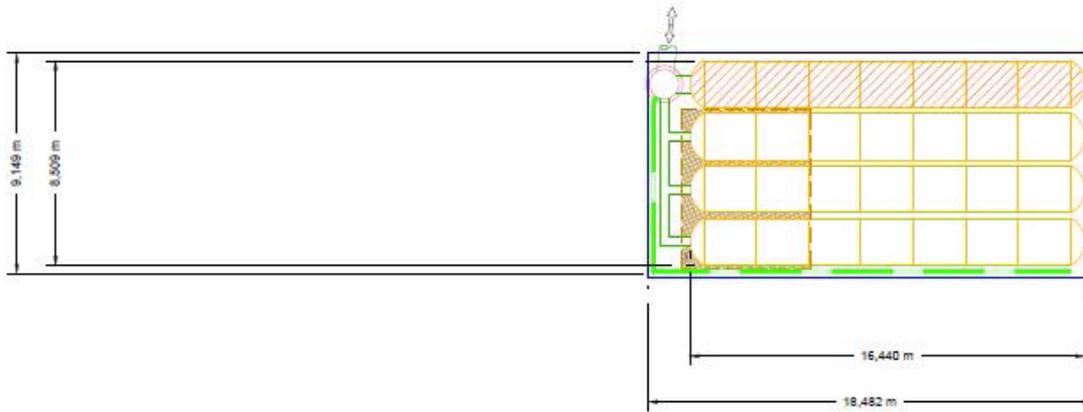
- i. In the attributes side bar, select TABULAR for the storage curve;
- ii. Select the three dots icon after clicking in the Curve Name cell;
- iii. Select add to create a new curve;
- iv. Copy the data from the two columns on the right in the StormTech Cumulative Storages spreadsheet (Elevation and area);
 - a. Note that PCSWMM only accepts a period as decimal separator.
- v. Paste the data into the PCSWMM table.

An example is provided in the following pages.

Example

PROPOSED LAYOUT

28	MC-3500 STORMTECH CHAMBERS
8	MC-3500 STORMTECH ENDCAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
20	STONE VOID (%)
130.0	SYSTEM VOLUME (m³)
171.9	SYSTEM AREA (m ²) SYSTEM
55.6	PERIMETER (m)



Storage Node Method:

Step 1 – Select the storage node and choose the TABULAR option for the storage curve:

Storage curve "" was not found.

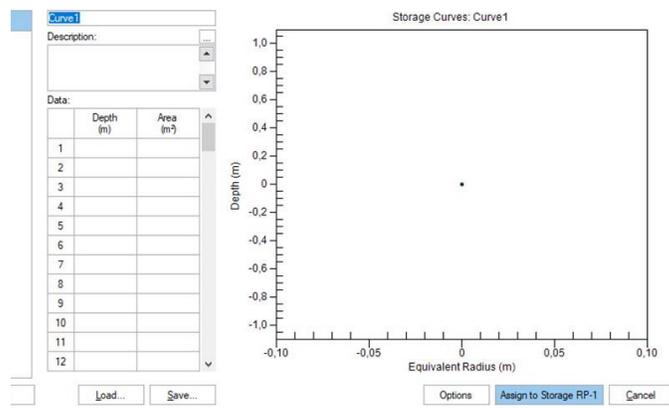
Storage RPI-1

Attributes	
Name	RP-1
X Coordinate	272052.387
Y Coordinate	504544.800
Description	
Tag	
Inflow	NO
Treatment	NO
Inlet Elev. (m)	42.55
Riser Elev. (m)	45.15
Depth (m)	1.2
Initial Depth (m)	0
Surcharge Depth (m)	0
Surfactant (mg/l)	0
Evap. Factor (m/d)	0
Curve Name	TABULAR
Options	
Baseline Pattern	
Time Series	
Scale Factor	1
Average Value (L/D)	0
Time Pattern 1	
Time Pattern 2	
Time Pattern 3	
Time Pattern 4	
Hydrograph	
Searchhead Area (m ²)	0
Storage	
Suction Head (mm)	0
Conductivity (µmhos/cm)	0
Initial Deficit	0
Results	
Pre. Depth (m)	0.02
Max. Depth (m)	0.1
Max. HGL (m)	43.65
Time Max. HGL (m)	05/07/2019 01:46
Rise. Max. Depth (m)	0.1
Max. Lat. Inflow (L/D)	0
Max. Total Inflow (L/D)	0
Total Lat. Inflow (L/D)	0
Storage Curve (ShapeCurve)	
Method of describing the geometric shape of the storage unit.	

Step 2 – Select the three dots icon after clicking into the Curve Name cell:

Depth (m)	f^*	2.6
Initial Depth (m)		0
Surcharge Depth (m)		0
Ponded Area (m ²)		0
Evap. Factor (fract)		0
Storage Curve		TABULAR
Curve Name		*
Inflows		
Baseline (L/s)		0
Baseline Pattern		
Time Series		
Scale Factor		1

Step 3 – Click to add a new Storage Curve:



Step 4 – Enter the project data into the StormTech Cumulative Storages spreadsheet and copy the two SWMM columns on the right:

Projet:

Modèle de Chambre - MC-3500
 Unités - Métrique
 Nombre de Chambres - 28
 Nombre de Bouchons - 9
 Vide dans la Pierre (Porosité) - 20
 Radier du Lit de Pierre Nette - 42.55
 Épaisseur de Pierre sur les Chambres - 305
 Épaisseur de Pierre sous les Chambres - 222
 Aire du Système - 171.9 m²

ADS StormTech

Inclure le Périmètre de Pierres dans les Calculs

Aire Min. - 146,117 m. carrés

Fichier de Volume Cumulatif Stormtech MC-3500

Hauteur du Système (mm)	Incément Chambre Seul (m ³)	Incément Bouchon Seul (m ³)	Incément Chambres (m ³)	Incément Bouchon (m ³)	Incément Pierre (m ³)	Incément Ch. Bouch. et Pierre (m ³)	Cumulatif Système (m ³)	Elevation (m)	Hauteur (m)	Aire (m ²)
1676	0.00	0.00	0.00	0.00	0.873	0.87	130.06	44.23	0.000	34.363
1651	0.00	0.00	0.00	0.00	0.873	0.87	129.18	44.20	0.025	34.363
1626	0.00	0.00	0.00	0.00	0.873	0.87	128.31	44.18	0.051	34.363
1600	0.00	0.00	0.00	0.00	0.873	0.87	127.44	44.15	0.076	34.363
1575	0.00	0.00	0.00	0.00	0.873	0.87	126.56	44.12	0.102	34.363
1549	0.00	0.00	0.00	0.00	0.873	0.87	125.69	44.10	0.127	34.363
1524	0.00	0.00	0.00	0.00	0.873	0.87	124.82	44.07	0.152	34.363
1499	0.00	0.00	0.00	0.00	0.873	0.87	123.95	44.05	0.178	34.363
1473	0.00	0.00	0.00	0.00	0.873	0.87	123.07	44.02	0.203	34.363
1448	0.00	0.00	0.00	0.00	0.873	0.87	122.20	44.00	0.229	34.363
1422	0.00	0.00	0.00	0.00	0.873	0.87	121.33	43.97	0.254	126.139
1397	0.00	0.00	0.00	0.00	0.873	0.87	120.46	43.95	0.279	125.196
1372	0.00	0.00	0.05	0.00	0.864	0.91	119.58	43.92	0.305	124.631
1346	0.01	0.00	0.15	0.01	0.841	1.00	118.67	43.90	0.330	124.069
1321	0.01	0.00	0.23	0.01	0.824	1.07	117.87	43.87	0.356	123.461
1295	0.01	0.00	0.32	0.01	0.806	1.14	116.81	43.85	0.381	122.861
1270	0.02	0.00	0.54	0.02	0.761	1.32	115.47	43.82	0.406	122.212
1245	0.03	0.00	0.82	0.02	0.706	1.54	114.15	43.79	0.432	121.545
1219	0.04	0.00	0.99	0.02	0.670	1.68	112.61	43.77	0.457	120.834
1194	0.04	0.00	1.13	0.03	0.642	1.80	110.92	43.74	0.483	120.082
1168	0.04	0.00	1.25	0.03	0.617	1.90	109.12	43.72	0.508	119.299
1143	0.05	0.00	1.35	0.04	0.595	1.99	107.23	43.69	0.533	118.477
1118	0.05	0.01	1.45	0.04	0.575	2.07	105.24	43.67	0.559	117.619
1092	0.05	0.01	1.54	0.05	0.556	2.14	103.18	43.64	0.584	116.706
1067	0.06	0.01	1.62	0.05	0.539	2.21	101.04	43.62	0.610	115.757
1041	0.06	0.01	1.69	0.05	0.524	2.27	98.83	43.59	0.635	114.777
1016	0.06	0.01	1.76	0.06	0.509	2.33	96.56	43.57	0.660	113.676
991	0.07	0.01	1.83	0.06	0.495	2.38	94.23	43.54	0.686	112.578
965	0.07	0.01	1.89	0.06	0.482	2.44	91.85	43.52	0.711	111.437
940	0.07	0.01	1.95	0.07	0.470	2.49	89.41	43.49	0.737	110.212
914	0.07	0.01	2.00	0.07	0.458	2.53	86.93	43.46	0.762	108.912
889	0.07	0.01	2.06	0.07	0.447	2.58	84.39	43.44	0.787	107.558
864	0.08	0.01	2.11	0.08	0.436	2.62	81.82	43.41	0.813	106.137
838	0.08	0.01	2.15	0.08	0.427	2.66	79.20	43.39	0.838	104.642
813	0.08	0.01	2.20	0.08	0.417	2.70	76.54	43.36	0.864	103.079
787	0.08	0.01	2.24	0.08	0.408	2.73	73.85	43.34	0.889	101.427
762	0.08	0.01	2.28	0.09	0.399	2.77	71.11	43.31	0.914	99.688
737	0.08	0.01	2.32	0.09	0.391	2.80	68.35	43.29	0.940	97.870
711	0.08	0.01	2.35	0.09	0.383	2.83	65.55	43.26	0.965	95.914

Pour SWMM

Step 5 – Paste the data into the PCSWMM table and assign the curve to the storage node:

Choose a Storage Curves for Storage RP-1

Curves: Curve1

Name: ST1
 Description: 28 MC-3500

Data:

	Depth (m)	Area (m ²)
1	0	34.362710
2	0.0253999...	34.362710
3	0.0507999...	34.362710
4	0.0761999...	34.362710
5	0.1015999...	34.362710
6	0.1269999...	34.362710
7	0.1523999...	34.362710
8	0.1777999...	34.362710
9	0.2031999...	34.362710
10	0.2285999...	34.362710
11	0.2539999...	126.13963
12	0.2793999...	125.19614

Storage Curves: Curve1

Options Assign to Storage RP-1 Cancel

